WATER STORAGE
IN
MONTANA

North Fork of the Smith River Dam Labyrinth Structure

A Report Submitted to the

Sixtieth Montana Legislature

Office of the Governor

Pursuant to
Montana Code Annotated, Sec. 85-1-704 (1991)

January 2007

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I. EXECUTIVE SUMMARY

Montana law requires the Governor to submit a report on water storage to the Legislature each regular session. The Governor's Report on Water Storage in Montana prioritizes new rehabilitation and construction projects and summarizes rehabilitation and repair projects occurring during the previous two years. Appendix I contains MCA 85-1-703 Water Storage Policy.

For the 2009 Biennium, the Department of Natural Resources and Conservation (DNRC) will be requesting Renewable Resource Grant and Loan Program (RRGL) grants for the rehabilitation of Ackley Lake Dam and for the installation of automated monitoring instrumentation at Middle Creek Dam, as well as an evaluation of the feasibility of installing an early warning system.

Funding from the Water Storage Special Revenue Account is proposed for a pre-construction engineering analysis for seepage control measures at Deadman's Basin Dam and for the Smith Creek Supply Canal, Nilan Project, which includes the rehabilitation and lining of canal sections that supply the Nilan Project. Hydropower Earnings Account funding will be used for a feasibility study and alternatives evaluation at Cataract Dam; for the Flint Creek Canal Lining Project; for the design of the Deadman's Basin Dam outlet structure; and for the Ackley Lake Dam Rehabilitation Project.

New project proposals with sponsors other than DNRC include the construction of a dam seepage control berm at Beaver Creek Dam owned by Hill County; reconstruction of Carter Ponds Dam, owned by Fergus County; and the reconstruction of Raymond Dam, owned by Sheridan County. A variety of funding sources will be used to finance construction of the foregoing project proposals including RRGL grants and loans.

In the last biennium, DNRC received a RRGL Program grant and a loan for the rehabilitation of the North Fork Smith River Dam. Additional funding for the project was requested as a biennial appropriation from the Water Storage Special Revenue Account. The rehabilitation was completed in the spring of 2006. The rehabilitation of Park Lake Dam, owned by Montana Fish, Wildlife, and Parks and located in Jefferson County, was completed in June of 2006. Funding for Park Lake Dam was provided through proceeds from fishing license fees by the Legislature in 2001 and 2003.

DNRC had a number of emergency repairs with which to contend over the course of the 2005 Biennium. A sinkhole depression was discovered on the upstream side of Middle Creek Dam adjacent to the emergency spillway in August of 2006 and its repair was completed in October 2006. The Deadman's Supply Canal was renovated after a flood event caused significant damage. Major concrete structures were rehabilitated, and more than one mile of the canal was rebuilt and lined.

Elsewhere, the Tongue River Dam Prototype Panel Repair Project involved the repair of damaged concrete on the pre-cast panels of the emergency spillway. The Martinsdale North Dam Riprap Project called for stabilizing a slope to eliminate continued plugging of the intake structure. The project will be completed during the winter of 2007. Repair work was completed on the Martinsdale Canal Drop Structure Number One. Deteriorating concrete was patched and fill was placed to provide better maintenance access.

The outlet structure at the Nilan North Dam is in very poor condition and a considerable amount of seepage exits in the location of the outlet. Repair work includes replacing the outlet structure and

installing filters and drains at the outlet terminal structure to control and collect seepage. The repairs at Nilan North Dam will are scheduled for summer 2007.

Contract preparation was completed and consultants selected for a feasibility study on rehabilitating the spillway of Ruby Dam. DNRC staff has initiated a rehabilitation feasibility study for the rehabilitation of Frenchman Dam. Preliminary drilling work was completed in the late fall 2006. State Water Projects staff will finalize the feasibility study over the course of this winter for completion in spring 2007. A pedestrian and maintenance bridge was replaced in fall of 2006 at the state's Broadwater Hydropower Project.

Recently completed or ongoing work on non-state owned water storage projects include: The addition of a new upstream outlet tower and gates along with replacement of upstream concrete at Lake Frances East Dam (Phase II), owned by the Pondera Canal Company; the rehabilitation of Doney Lake Dam, owned by Murphy Ranches, Inc. and completed in the fall of 2005 when the dam outlet works were replaced and a downstream drainage system was added; spillway modifications for Mill Lake Dam in the Bitterroot-Selway Wilderness scheduled for the fall of 2007; construction at Basin Creek Dam, owned by the City of Butte, consisting of replacing and upgrading the emergency spillway, the addition of upstream control gates on the outlet and spillway, and slip-lining of the outlet pipes; and planning for the rehabilitation of Vandalia Dam in Valley County.

Photos of the various projects are linked to the online version of the Governor's Report on Water Storage at: http://dnrc.mt.gov/wrd

II. INTRODUCTION

The Office of the Governor is required by statute to submit a report on water storage to the legislature each regular session. The Governor's Report on Water Storage in Montana reviews state water storage policy and statutory criteria used for prioritization of proposed projects; identifies water storage projects proposed for development, including the rehabilitation of existing projects and progress on new projects; and summarizes water storage projects in progress over the previous two years.

The focus of this report is on projects that are partially or fully funded by the state. Projects that are regulated by the state with outside funding sources are also included. The federal government has a number of ongoing projects, primarily considered as maintenance, that are not included in the report. The report includes a table summarizing the prioritized projects and a map (see Figure 1) indicating each project type and its location. Information of water storage policy and statutory criteria can be found in Appendix.

Renewable Resource Grant and Loan (RRGL) Program

The Montana Renewable Resource Grant and Loan (RRGL) Program provides grant and loan funding for projects that conserve, manage, develop, or protect renewable resources. RRGL loans are made available to public entities with proceeds from the sale of coal severance tax secured bonds and frequently are offered at a subsidized interest rate. The subsidy is paid with coal tax revenues. DNRC's recommendation includes the amount of financing needed to meet project and financing

expenses and the interest rate suggested. Public loans are limited to an applicant's ability to repay under the standard repayment terms and by the bonding capacity of DNRC. Applicants who receive grant funding in conjunction with a loan do not receive an interest subsidy.

Statutorily, $4M is available in funding for the RRGL Program. However, DNRC is requesting $5M in funding for the 2007 legislative session (2009 Biennium). In past sessions, the legislature has elected to apply a $100,000 limit on individual grants, although it has authority to appropriate additional funding for projects. The 59th Legislature appropriated an additional $600,000 in grant funding in 2005 for the 2007 biennium, making it possible to fund 47 projects. In addition to the $4.6 million made available for grants, $300,000 was appropriated for project planning grants and $100,000 for emergency grants in the 2007 biennium. Of the 47 projects funded, four DNRC water storage projects received grant funding. (See Table 2.)

DNRC has requested RRGL grant funding for four water storage projects in the 2009 biennium. Additionally, $650,000 in RRGL loans has been requested by DNRC for three state-owned water storage projects for the 2009 biennium. (See Table 1.) Matching federal funds and substantial private contributions are also used to help fund project rehabilitation costs. Funding approved in previous legislative sessions must be reauthorized by the current legislature.

Water Storage Special Revenue and Hydropower Earnings Accounts

Dams classified as high-hazard that are in unsafe condition receive first preference for use of funds from the state's Water Storage Special Revenue Account (Section 85-1-631 MCA). This account was designated by the 1991 Legislature to allocate 25 percent of the grant funds available, or $500,000 each biennium, under the Renewable Resource Grant and Loan (RRGL) program, to be used exclusively for water storage projects.

Currently, the state's Legislative Finance Committee is requesting legislation that the revenue deposited in the Water Storage State Special Revenue Account provide funds "exclusively for construction, operation, rehabilitation, expansion, maintenance, and modification of state-owned water storage projects."(See LC0147) The changes proposed clarify the use of the account, providing that money not expended from the water storage account during the previous biennium must remain in the account; that deposits to the account be placed in short-term investments to accrue interest; and, that any interest is deposited in the account. Funds from the account would no longer be available for the purchase of property, or planning studies.

Interest income of the resource indemnity trust fund would continue to provide $500,000 deposited in the water storage state special revenue account created by MCA 85-1-631. In addition, a onetime infusion of $122,984 transferred from the Natural Resources Scholarship Fund is recommended to assist the department with the backlog of rehabilitation projects on state-owned dams. DNRC would no longer administer the fund as an integral part of the Renewable Resource Grant and Loan Program. The preferences currently listed in the statute, 85-1-704 (4) would no longer control the decision-making process in establishing budget priorities for the allocation of state water storage development funds.

The Hydropower Program administers the development and operation of hydropower facilities on state-owned water projects. To date, one hydropower facility, the Broadwater Power Project near Toston, has been built. Earned revenues are used to help finance the rehabilitation of water storage projects administered by the DNRC State Water Projects Bureau. After debt payments and operating expenses, approximately $1.3 million in funding is available to rehabilitate state-owned dams.

Water Storage Project Classification and Terminology

It is important that the reader have a basic understanding of some principles and terms related to dam safety classification used in this report. Standards used by the State of Montana classify a dam spillway as *unsafe* if it would be unable to route the maximum inflow design flood or if the dam's structural integrity has become compromised since construction. A dam is classified as *high-hazard* if its failure has the potential for loss of human life, regardless of its current structural condition.

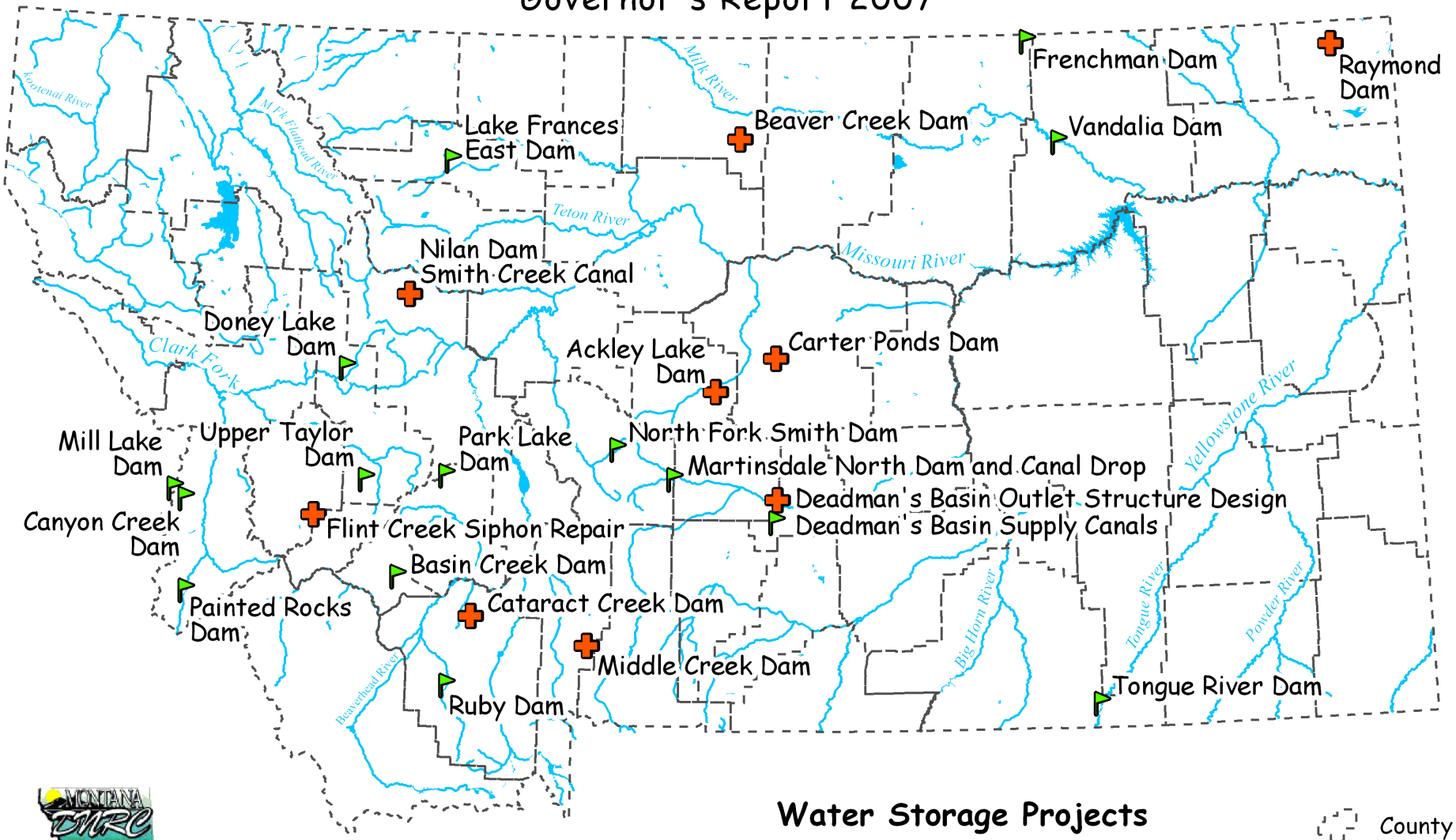
The state's highest priority for repair and rehabilitation is assigned to dams classified as high-hazard that are in unsafe condition. The high-hazard classification should not be confused with an assessment of a dam's structural integrity or condition. All water storage projects addressed in the Governor's Report are classified high-hazard, and will remain classified as high-hazard following the completion of any ongoing or proposed work. However, the safety issues with each project will eventually be resolved.

Repair of a project most often refers to scheduled or emergency action taken to return dam function to original design capacity or for a project to continue operation at a reduced, but safe level. *Rehabilitation* involves upgrading existing projects to comply with or exceed current design standards and often includes repair work. Design standards have evolved considerably since the construction of most of the state's dams and repair alone may not bring a facility into compliance with current design standards. The storage capacity of a project is sometimes increased during rehabilitation, especially if enlargement is determined to be a cost-effective alternative.

DNRC's State Water Projects Bureau is responsible for overseeing the operations, maintenance, and rehabilitation of 21 active state-owned water storage projects across the state. DNRC is also responsible for overseeing repairs, maintenance, and rehabilitation of over 250 miles of irrigation canals associated with ten state-owned projects. Canals are integral components of many state water projects, delivering water to water users served by the respective projects. Many of these canals were constructed in the 1930s and 1940s and are now in need of substantial rehabilitation. The Canal Operations Program is responsible for identifying and correcting operational deficiencies on state-owned canals.

Proposed, Ongoing, or Recently Completed Water Storage Projects in Montana

Governor's Report 2007



Source: Montana DNRC
Water Resources Div.
GIS Program 12/04/06

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Water Storage Projects

- Proposed Projects for 2007 Biennium
- Ongoing or Recently Completed Projects
- County
- Lake
- Stream

III. WATER STORAGE PROJECTS PRIORITIZED

One of the requirements of the water storage report is to prioritize storage projects proposals for the upcoming biennium. After careful evaluation of the nature and extent of deficiencies, potential for loss of life downstream, and economic impact should the project fail; the following suggested prioritization has been developed:

1. **Beaver Creek** (Hill County)
2. **Ackley Lake Dam Rehabilitation** (Judith Basin)
3. **East Fork Siphon Replacement & Main Canal Lining** (Granite)
4. **Middle Creek Dam Automated Instrumentation** (Gallatin)
5. **Smith Creek Canal Seepage Abatement and Rehabilitation** (Lewis & Clark)
6. **Deadman's Basin Outlet Structure Design** (Wheatland)
7. **Carter Ponds Dam Reconstruction** (Fergus)
8. **Instrumentation for Storage Project Sites** (Statewide)
9. **Cataract Creek Dam Feasibility and Alternative Evaluation** (Madison)
10. **Raymond Dam Reconstruction** (Sheridan County)

Table 1 lists storage project proposals for the 2009 Biennium in order of priority, and tabulates funding sources. Table 2 lists ongoing or recently completed storage projects during the past biennium. Dams classified as high-hazard that are in unsafe condition receive first preference for use of funds from the state's Water Storage Special Revenue Account (Section 85-1-631 MCA). Additionally, revenue received from the state's Hydropower Earnings Account is used to assist in the rehabilitation costs of active state-owned water projects.

The Montana Renewable Resource Grant and Loan (RRGL) Program provides funding for resource-related projects that conserve, manage, develop, or initiate the beneficial use of a renewable resource. Dams owned by private individuals and organizations with public benefits are eligible for $5,000 grants from the RRGL private grant and loan program to assist with repair costs. As shown in Tables 1 and 2, matching federal funds and substantial private contributions are also used to assist with rehabilitation costs.

Table 1. 2009 Biennium Water Storage Project Proposals Prioritized

Storage Project Name (County) *Applicant / Owner*	RRGL Grant Rank/Amount Requested	Water Storage Special Revenue Account	RRGL Loan	Other (Funding source)
1) Beaver Creek Dam (Hill County)	$100,000 (rank 17)			Hill County Reserves $169,749
2) Ackley Lake Dam Rehabilitation (Judith Basin County) *Dept. of Natural Resources & Conservation (DNRC)*	$100,000 (rank 7)	$300,000	$200,000	Hydropower Earnings $800,000
3) Flint Creek Siphon Repair (Granite County) *DNRC*	$100,000 (rank 10)	300,000	$400,000	Hydro Earnings $320,000 Federal - NRCS $480,000(+)
4) Middle Creek Dam Automated Instrumentation - (Gallatin County) *DNRC*	$100,000 (rank 15)			
5) Smith Creek Canal Repairs Nilan Dam Project (Lewis & Clark) *DNRC*	$100,000 (rank 13)	$20,035	$50,000	Nilan Water Users Association $12,450
6) Deadman's Outlet Structure Design (Wheatland County) *DNRC*		$25,000		Hydropower Earnings $50,000
7) Carter Ponds Dam Reconstruction (Fergus County) *Fergus CD, Others*	$100,000 (rank 22)			
8) Instrumentation for Storage Project Sites (Statewide) *DNRC*				General Fund - $5,000 per year
9) Cataract Feasibility and Alternative Evaluation (Madison County) *DNRC*				Hydropower Earnings $75,000
10) Raymond Dam Reconstruction (Sheridan County)	$100,000 (rank 61)			Sheridan County match: $37,030

IV. JUSTIFICATION FOR 2009 BIENNIUM PROJECT PROPOSAL PRIORITIZATION

The following rehabilitation projects are prioritized by Montana Department of Natural Resources and Conservation (DNRC) according to the criteria identified by Sec. 85-1-704 (4) (MCA) listed in Appendix I of this report. The Renewable Resource Grant and Loan Program (RRGL), administered by DNRC, independently ranks project proposals using a set of criteria that includes priority consideration for water storage projects. A number of the projects addressed in this report are seeking partial funding from the RRGL Program.

1) Beaver Creek Dam – Seepage Control Berm (Hill County)

Beaver Creek Dam is located on Beaver Creek approximately 13 miles south of Havre, Montana. The dam is owned and operated by Hill County and provides flood control, recreation, irrigation and fish and wildlife benefits for the residents of Havre and surrounding community. The project was planned, designed, and funded by the Natural Resources Conservation Service (NRCS) under the authority of the Watershed Protection and Flood Prevention Act (PL-566). Hill County also provided funds for the project. Construction was completed in 1974. The dam is classified as a high hazard dam and is regulated by DNRC.

Periodic inspections raised several concerns with seepage on the right abutment and with operation of the outlet works. In 2001, Renewable Resource Grant and Loan (RRGL) funds were awarded Hill County to hire an engineer to study repair options. Hill County contracted with HKM Engineering to evaluate problems at the dam. HKM developed alternatives for repair of the outlet works and preliminary design for repair of the right abutment seepage.

Seepage in this area has been a persistent concern since dam was constructed. Recent data collection efforts have shown that seepage pressure in the foundation is higher than originally anticipated. All of the engineers that have studied the data are in agreement that the seepage poses a serious threat to the stability of the dam. DNRC subsequently put a condition on the operation permit for the dam that the seepage problem must be addressed before 2009. Failure to meet the condition could result in DNRC imposing a reservoir storage level restriction for future use until the seepage is addressed.

Hill County is requesting RRGL funds of $100,000 (rank 17) for final design and construction of a stability berm and drainage system on the right abutment of the dam. Hill County is also providing significant cost share funds in the amount of $169,749. Other problems identified in the feasibility study will be addressed at a later date using a combination of federal and local funds. The proposal meets criteria 3 (a), (b), and (c) of the water storage statute.

2) Ackley Lake Dam Rehabilitation (Judith Basin County) photo

Ackley Lake Reservoir is owned by DNRC, with daily operations and maintenance the responsibility of the Ackley Lake Water Users Association. The dam and canal system was constructed by the State Water Conservation Board in 1938. Water from the reservoir is used for irrigation, recreation, and the regulation of stream flows. The dam and reservoir are located in Judith Basin County approximately 10 miles south of Hobson.

Ackley Lake State Park, which is managed by Montana FWP, is a popular fishing and water-based recreation site. A pool level restriction has been placed on the dam as a result of high foundation pore-pressures that could affect the structural integrity of the dam, creating a serious public health and safety concern if repairs are not made.

The estimated total cost of the project at the feasibility stage is approximately $1.4 Million. DNRC has applied for an RRGL grant in the amount of $100,000 (rank 7) and requested an RRGL loan in the amount of $200,000 for the project. Additionally, a biennial appropriation of $1.1 Million for the project will come from the Water Storage and Hydropower Earnings Accounts.

The construction phase of the rehabilitation project, which includes installation of a toe berm and drain system, is tentatively scheduled to begin in 2008, pending the availability of funds. The rehabilitation of Ackley Lake Dam will bring this high hazard project into full compliance with Montana Dam Safety regulations. The proposal meets criteria 3 (a), (b), and (c) of the water storage statute.

3) The Flint Creek Siphon Repair (Granite County)

The siphon is a 54-inch diameter, 4,056 foot-long steel pipe installed in 1938 and owned by DNRC. Water stored in East Fork of Rock Creek Reservoir is diverted from East Fork of Rock Creek, below the dam, over a divide to the Flint Creek drainage where it is used for irrigation of lands located between Phillipsburg and Drummond.

This project is in need of rehabilitation in order to sustain its water delivery system, which is critical to the area's agricultural economy. The siphon now risks total structural failure. Each year more corrosion holes are found and repaired. The siphon needs to be replaced due to its age and progressive deterioration. DNRC is requesting a $100,000 RRGL Grant (rank 10) for project repair.

The entire length of Flint Creek and its tributary, Boulder Creek, have been identified as critical bull trout habitat (USF&WS, 2002). The lower reaches are designated as foraging, movement, and over-winter habitat for bull trout. Forestalling action to replace the siphon and maintain the current flow regime in Flint Creek could be construed as a violation of Section 7, (1), (A) of the Endangered Species Act. The proposal meets criteria 3 (a,) (b), and (c) of the water storage statute.

4) Middle Creek Dam Automated Instrumentation (Gallatin County) photo

Middle Creek Dam is located approximately 15 miles south of Bozeman in the headwaters of Hyalite Creek in the Gallatin Range. The purpose of this project is to enhance the current dam safety program at Middle Creek Dam, by (1) Installing an automated instrumentation system at the dam to improve the ability of DNRC to monitor and evaluate both reservoir operations and embankment performance, and (2) Evaluating the feasibility and cost of installing an early warning instrumentation system that would alert emergency response personnel in the event of a dam failure. Middle Creek Dam was selected due to its importance as a municipal water supply for Bozeman, the relatively large amount of development in the potential inundation zone, and the difficult issue of access during the winter months many other project sites pose. DNRC is requesting an RRGL Grant in the amount of $100,000 (rank15) for the proposal. The proposal meets criteria 3 (a), (b), and (c) of the water storage statute.

5) Smith Creek Canal Seepage Abatement and Rehabilitation – Nilan Dam (Lewis & Clark) **photo**

The Nilan Dam Water Project is owned by the DNRC and operated by the Nilan Water Users Association. The Project was originally comprised of a 10,092 acre-feet, off-stream reservoir, a 5.5 mile-long supply canal, and three delivery canals, totaling 23.5 miles in length. Storage water carried by the supply canal is provided by two sources, Smith Creek and Ford Creek. The Smith Creek branch of the supply canal is 3.7 miles long. The construction of the original project was completed in 1951, and ownership of the 16.5 mile Florence Canal was transferred to the Water Users in 1995.

Water from the Project provides support for agriculture, fish and wildlife, and recreation. The Smith Creek branch of the Supply Canal now requires substantial rehabilitation due to dilapidation and berm instability. The right bank of the canal failed after spring runoff in 2005, and was shut down for the remainder of the irrigation season. In addition to runoff causing slope failure, seepage from the canal also flooded nearby hay fields. The canal requires considerable construction work for rehabilitation.

To address these concerns, DNRC proposes to line and rehabilitate the areas most at risk to slope failures. The RRGL Program provided a planning grant in the amount of $10,000 in 2006. DNRC is now requesting an RRGL Grant in the amount of $100,000 (rank 13) and a loan of $50,000 for the project. These measures will rehabilitate the Nilan Water Project's infrastructure, protect private property, and conserve water, meeting criteria 3 (a), (b), and (c) of the water storage statute.

6) Deadman's Basin Outlet Structure Design (Wheatland) photo

Deadman's Basin Dam and Reservoir are located in Wheatland County approximately 18 miles east of Harlowton. The dam is owned by DNRC and operated and maintained by the Deadman's Basin Water Users Association. The earth-fill dam is 60 feet high, has a crest length of 1,490 feet, and impounds 72,218 acre-feet of water at full pool. The stored water is used for agricultural irrigation. Recreation is also a major benefit of the reservoir, although no specific allocation to this use currently exists. The dam was completed in 1941.

Deadman's Basin Dam is classified as a high hazard dam. The project involves designing a new terminal structure to replace the existing outlet structure, and installing a filtration and drainage system to allow for the safe discharge of currently uncontrolled seepage. The existing outlet structure has exceeded its design life and is beyond repair. DNRC proposes using $50,000 from the Hydropower Earnings Account and $25,000 from the Water Storage Special Revenue Account.

This project will have the beneficial effect of providing a new design for a critical component of the dam. Replacing the outlet structure will greatly reduce the potential of any structural failure, protect the integrity of the dam, and reduce downstream public and property risks. This would also allow for the continued use of reservoir water for agricultural irrigation, municipal drinking water, recreation and the maintenance of fishery resources. The proposal meets criteria 3 (a), (b), and (c) of the water storage statute.

7) Carter Ponds Dam Reconstruction (Fergus) **photo**

Upper and Lower Carter Pond Dams are located about six miles north of Lewistown. The Carter Ponds are widely used by the local community for fishing and recreation. The ponds also provide waterfowl habitat, storm water retention, and stock water. Each pond has a Montana Department of Fish, Wildlife, & Parks (FWP) fishing access site. The dams and most of the shoreline are privately owned, but a walk-in public easement surrounds both reservoirs. The upper pond site has been developed with a latrine, gravel boat launch, and picnic tables. The lower site is not developed. Fishing use is substantial with about 1,600 angler-days each year.

Early in 2004, the trickle tube on the lower dam collapsed, but the dam did not fail. In July 2004, the upper dam had a gradual failure due to pipe corrosion. DNRC recommended reconstruction or breaching of both dams. A rural fire hydrant that serves 200 to 300 people located at Upper Carter Pond is currently not functioning due to low water. The community was distraught at the prospect that the dams would require breaching.

The Fergus County Conservation District, in cooperation with Ducks Unlimited, a private landowner; and local, state, and federal entities are seeking RRGL grant (rank 22) assistance of $100,000 to match other funds being raised for the $360,133 for repair of both dams. Upon project completion, each dam will store approximately 140 acre-feet. The proposal meets criteria 3 (a), (b), and (c) of the water storage statute.

8) Monitoring Instrumentation for State-Owned Projects (Statewide & ongoing)

Seepage monitoring is required as a condition of the operating permits for all dams regulated by the Montana Dam Safety Program. Twenty-two DNRC dams are regulated under the program and have monitoring wells installed. The SWPB is currently upgrading the seepage monitoring data collection systems on DNRC projects as funding allows.

To date, instrumentation systems were upgraded on Tongue and East Fork Dams during FY2006 with the installation of new data loggers and other associated equipment. Measurements are taken by hand at locations where monitoring systems are not in place. The data is collected monthly, reviewed and compared to historical trends. The ongoing process meets criteria 3 (a), (b), and (c) of the water storage statute.

9) Cataract Creek Dam Feasibility and Alternative Evaluation (Madison County)

Cataract Creek Dam is located in Madison County, about two miles southwest (upstream) from the Community of Pony and eight miles southwest of the Town of Harrison. The reservoir is fed by Cataract Creek, which originates 2.3 miles southwest of Cataract Creek Dam at Mason Lake. The Cataract Water Users Association operates the dam. The earth-fill dam was completed in 1959. Cataract Creek Dam is 80 feet high and 775 feet long. The dam's outlet works consist of a five-foot diameter dry well with two 30-inch diameter gate valves.

The rehabilitation of Cataract Dam is needed to bring the structure into compliance with the Montana Dam Safety Act. The project involves securing the engineering services from a qualified consultant to identify the most practical means of rehabilitating the spillway, and addressing the excessive seepage. The feasibility and alternative evaluation will identify the best, most cost effective rehabilitation alternative to greatly reduce downstream public and property risks associated with a high hazard dam. This would allow for the continued use of reservoir water for agricultural irrigation, recreation, and the maintenance of fishery resources. DNRC proposes using $75,000 from the Hydropower Earnings Account for the feasibility evaluation. The proposal meets criteria 3 (a), (b), and (c) of the water storage statute.

10) Raymond Dam Reconstruction (Sheridan County)

Raymond Dam is a 16-acre public recreational reservoir constructed by the federal Work Projects Administration (WPA) in 1936. Over the years, gradual siltation and a 1993 flash flood have reduced the reservoir's storage capacity and deteriorated its recreational value for fishing, swimming, and boating. Sheridan County is requesting a $100,000 (rank 61) RRGL Program grant for the preparation of an engineering assessment and for dredging the sediment build-up from the reservoir to preserve recreational and other public benefits provided by the reservoir. Sheridan County will provide $37,030 in matching funds, for a total project budget of $137,030. The proposal meets criteria 2 (b), (c), (d), (e), and (f) of the water storage statutory criteria.

V. ONGOING OR RECENTLY COMPLETED REPAIR OR REHABILITATION PROJECTS (2005 or 2007 Biennium)

Table 2. Recently Completed or Ongoing Water Storage Projects (2005 or 2007 Biennium)

Storage Project Name (County) *Applicant / Owner*	**RRGL Grant Awarded 2005, 2003 Biennium**	**Water Storage Special Revenue Account**	**RRGL Loan**	**Other (Funding source)**
State Owned Projects				
North Fork Smith River Dam Rehabilitation (Meagher County) *DNRC*	$100,000 (2003)	$423,603	$425,000 (2003)	
Upper Taylor Dam Rehabilitation (Powell County) *Montana Dept. of Corrections (MDOC)*	$80,000 (2003)			MDOC $ 23,449
Ackley Lake Dam Temporary Seepage Repair and site investigation (Judith Basin County) *DNRC*				Hydropower Earnings $35,729
Painted Rocks Gate Hoist Rehabilitation (Ravalli County) *DNRC*				FWP $10,796 (fishing license funds) PRWUA $10,796
Painted Rocks Dam Spillway and Outlet Feasibility (Ravalli County) *DNRC*				$104K Hydropower Earnings Account 2005
Painted Rocks Emergency Gate Rehabilitation (Ravalli County) *DNRC*				FWP $29,200 (fishing license funds) PRWUA: $29,200
Park Lake Dam Rehabilitation (Jefferson County) *MT. Dept of Fish, Wildlife* and *Parks*				$210,000 – 2001 Legislature $500,000 – 2003 Legislature Fishing license funds
Tongue River Spillway Panel Prototype Repairs (Big Horn County) *DNRC*				$152,000; from remaining Tongue River Project Rehabilitation Funds
Tongue River East Draw Drain Installation (Big Horn County) *DNRC*				$25,690; from remaining Tongue River Project Rehabilitation Funds
Middle Creek Dam Sinkhole Repair (Gallatin County) *DNRC*				CARDD Emergency Funds, $30,000; Water Users, $20,000; Hydro, $27,975
Martinsdale North Dam Riprap Project (Wheatland) *DNRC*	$100,000 (2005)		$92,000	Water Users: $25,000 Hydro Earnings: $45,000
Martinsdale Outlet Canal Drop Structure Repairs (Wheatland) *DNRC*	$100,000 (2005)	$28,080		Water Users - $12,000
Nilan North Dam Outlet Repairs (Lewis & Clark County) *DNRC*		$105,000		
Deadman's Basin Supply Canal Emergency Repair (Wheatland) *DNRC*	$100,000 – 2005 $75,332 Emergency Grant		$53,350	Water Users - $88,000 ECG - $100,000 Hydro funds - $277,000

Deadman's Basin Project, Phase 2 Canal Repairs (Wheatland County) *DNRC*				Private Funding $450,000
Ruby Dam Rehabilitation Feasibility (Madison) *DNRC*		$213,000 (2005)		Hydropower Earnings: $71,000 (2005)
Frenchman's Dam Rehabilitation Feasibility Study (Phillips) *DNRC*	$100,000 (2005)			$65,000 (DNRC in-kind)
Toston Broadwater Bridge Replacement, (Broadwater County) *DNRC*				Hydropower Earnings $750,000
Non-State Owned Projects				
Lake Frances East Dam Rehabilitation (Pondera County) *Pondera County Canal Co.*				$5000 – private grant and loan program; remainder privately funded
Doney Lake Dam Rehabilitation (Powell County) *Murphy Ranches, Inc.*				U.S. Fish & Wildlife Service; Ducks Unlimited
Mill Lake Dam Rehabilitation (Ravalli County) *Mill Creek Irrigation District*	$100,000 (2003)		$472,000 (2003)	Mill Creek I.D. $290,487 (spec.) Mill Creek I.D. $98,315 (in kind) Mill Creek I.D. $25,498 (O&M)
Basin Creek Dam #1 (Silver Bow) *County of Butte-Silver Bow*	Natural Resources Damage Funds - $503K			Butte- Silver Bow $303K
Vandalia Dam (Valley) *Glasgow Irrigation District*	$100,000 (2005)			

State-Owned Rehabilitation and Repair Projects

The following section contains current information concerning state owned projects that were in progress when reported in the 2005 Governors Report on Water Storage, or were started during the past two years. Some projects have been completed during the last two years, while work on others is expected to continue into the next biennium.

North Fork of the Smith River Dam Rehabilitation (Meagher) photo

The rehabilitation of North Fork of the Smith River Dam, located near White Sulphur Springs, was completed in the spring of 2006 with the addition of a new spillway, drain system, and outlet terminal structure. The rehabilitation brings the dam into compliance with current Montana Dam Safety Standards and codes.

Upper Taylor Dam Rehabilitation (Powell) photo

Upper Taylor Dam is located on property of the Montana State Prison west of the City of Deer Lodge. The Montana Department of Corrections owns and operates Upper Taylor Dam. The dam is 40 feet in height and holds 300 acre-feet of water. The State Prison Ranch uses the dam for irrigation of grasslands.

The principal and emergency spillways are grossly undersized given the capacity of the dam. It is estimated that the loss of 20 lives, in the northwest section of the City of Deer Lodge, could be expected if the dam were to fail. Furthermore, the corrugated metal outlet pipe has reached the end of its design life. Significant corrosion of the outlet pipe could lead to failure of the entire dam.

The Department of Corrections received a grant from the RRGL Program from the 2001 legislative session for engineering services to develop a rehabilitation design for Upper Taylor Dam. In 2003, the Department of Corrections received an RRGL grant of $80,000 to fund one-third of the needed cost for repair. The remaining two-thirds of the necessary funding will come from proprietary State Prison Ranch funds and machinery and labor provided by the Job Corps as part of a training program.

The work includes the addition of an enlarged, rock-lined emergency spillway and slip lining of the current outlet pipe. Construction is currently underway on the spillway. Progress has been slow due to limited availability of Job Corps personnel. The slip lining of the outlet pipe was completed in November 2006.

Ackley Lake Dam Seepage Repairs (Judith Basin) **photo**

Ackley Lake Reservoir is owned by the DNRC, with daily operations and maintenance the responsibility of the Ackley Lake Water Users Association. The State Water Conservation Board constructed the dam and canal system in 1938. Water from the reservoir is used for irrigation, recreation, and the regulation of stream flows. The dam and its reservoir are located in Judith Basin County, approximately 10 miles south of Hobson.

A seepage area located downstream from the toe of the dam has been observed for a number of years. Standing and flowing water has been documented at this location, the amount of which varies with change in the storage level of the reservoir. In June of 2004, a small amount of water was observed flowing from a small area and a white clayey material appeared to have been deposited in the same vicinity. A two-inch diameter hole was also detected, and the flow rate had increased slightly over time.

Temporary repairs were initiated, which involved the placement of a sand and gravel filter blanket over the seepage area to prevent any further erosion and enlargement of the hole. The Ackley Lake Water User's Association provided the equipment used to spread the sand and gravel. The State Projects Bureau performed a subsurface investigation, installed relief wells, and completed a feasibility level design and cost estimate for dam rehabilitation. A reservoir filling restriction was also set in place.

Painted Rocks Gate Hoist Rehabilitation (Ravalli) **photo**

Painted Rocks Dam and Reservoir are owned by DNRC and used for irrigation, recreation, and flood control. The dam is located in Ravalli County, approximately 30 miles southwest of Darby. The reservoir storage at maximum capacity is 32,362 acre-feet. The State Water Conservation Board constructed the dam in 1939 with funds from the Public Works Administration. The dam is classified as a high-hazard structure, which means that its failure could cause loss of life. The gate hoist system was modified and upgraded to improve the ease and safety of gate operations and the emergency gate was rehabilitated. The work was completed by the fall of 2006.

Painted Rocks Dam Spillway and Outlet Feasibility Pre-construction Engineering (Ravalli)

A rehabilitation feasibility study of alternatives for the spillway and outlet structure of Painted Rocks Dam is underway. A variety of gate operation systems will be reviewed, with a preferred alternative selected to ensure long-term operability and low cost maintenance. The condition and capacity of the existing spillway needs evaluation to estimate the remaining lifespan of the system.

The steep angle of the chute makes it very difficult and dangerous to inspect. This spillway also has a severely tapering chute that may not be able to safely route the required inflow design flood for a dam of its size and hazard classification. Rehabilitation would be accomplished in two major phases, pre-construction engineering, and final engineering design and construction. The feasibility study (pre-construction engineering) will determine viable rehabilitation alternatives, identify the preferred alternative(s), and provide an estimate of future funding requirements.

Painted Rocks Emergency Gate Rehabilitation (Ravalli)

The emergency gate at Painted Rocks Dam was recently rehabilitated. Work included refinishing and replacement of critical hardware, including roller chains. The project was completed in fall of 2006.

Park Lake Dam Rehabilitation (Jefferson) **photo**

Park Lake Dam is an off stream reservoir owned by Montana Fish, Wildlife, and Parks (FWP) located in Jefferson County, south of Helena. The dam was built in 1872 to raise the level of the existing mountain lake as part of the Park Ditch Project, which supplied water to mining operations in the gulches above the City of Helena.

The rehabilitation, which was completed in the spring of 2006, included a completely reconstructed embankment, new emergency spillway, and spillway culvert structure. Dam ownership will be transferred from the FWP to the U.S. Forest Service. Park Lake Dam is now in compliance with Montana Dam Safety standards.

Tongue River Dam Prototype Panel Repair Project (Big Horn) **photo**

Tongue River Dam is located in Big Horn County on the Tongue River and is owned by DNRC and operated by the Tongue River Water Users Association. The Prototype Panel Repair Project involves the repair of damaged concrete on the pre-cast panels of the emergency spillway. Various prototype repairs will be installed and performance of these repairs will be evaluated over several seasons with varying weather conditions. The most effective, durable, and economical repair will then be selected and implemented over the remainder of the spillway. This project is utilizing $152,000 in private funds obtained from a settlement from the Tongue River Dam Rehabilitation. The repairs are expected to be competed by the end of 2007.

Tongue River Dam East Draw Drain Repair (Big Horn)

This project is located immediately downstream of the Tongue River Dam on the southeast side of the former river channel where the "East Draw" exits into the river channel. The work consisted of installing drains and replacing an existing weir at the mouth of the coulee. The work was performed to more effectively collect and control seepage from the reservoir and route it to outlets where it can be monitored over time for changes in flow rate and sediment load. The total project cost was $25,690. The project was paid for with federal funds remaining from the Tongue River Dam Rehabilitation. The project was completed in the summer of 2006.

Middle Creek Dam Sinkhole Repair (Gallatin) **photo**

Middle Creek Reservoir is located in the Gallatin Range about 15 miles south of Bozeman and serves as a source of municipal water for the city and irrigation water for the Middle Creek Water users Association. A sinkhole depression was discovered on the upstream side of Middle Creek Dam adjacent to the emergency spillway in August of 2006. The sinkhole was above the reservoir level when it was discovered.

Repairs included test excavations, excavation of the sinkhole, and extension of the existing protective liner to cover the area around the sinkhole. The repairs were completed in October 2006 and did not interfere with the operation of the dam or affect reservoir storage. The cost of the project was $90,000 and included an RRGL Emergency Grant in the amount of $30,000. DNRC and Middle Creek Water Users Association jointly funded the project.

Martinsdale North Dam Rip Rap Installation (Wheatland) photo

Martinsdale Reservoir is an off-stream storage project owned by DNRC and capable of storing 23,348 acre-feet of water. The reservoir is located about 2.5 miles southeast of the Town of Martinsdale. Water from the reservoir is used primarily for irrigation water supply, but is also used for water-based recreation. The reservoir, completed in 1939, includes two earthen embankment dams (East Dam and North Dam). The dams are classified as high hazard.

The outlet works is located through the North Dam near the right abutment. It consists of an intake structure, a 60-inch diameter reinforced concrete pipe tunnel, a dry tower with an operating gate and

an emergency gate, and an outlet structure. The inlet to the outlet conduit has had a recurring problem with plugging. The inlet structure became plugged in 1989, 2000, 2001, and 2002. The most serious incident occurred in September 2000. The plug was eventually removed by water jet cleaning of the outlet conduit from the downstream side of the outlet conduit, and pumping water into the inlet tower. About 200 cubic yards of sand, silt, and gravel was removed from the outlet conduit and intake structure. Since 2000, significant funds have been spent unplugging the conduit and excavating sediment from around the intake structure.

DNRC has assembled a funding package including a $100,000 RRGL grant (2005), a $92,000 RRGL loan, $45,000 from the Hydropower Earnings Account, and $25,000 from the water users association. The project involves the placement of riprap on the right abutment slope above the intake structure to stabilize this slope and eliminate continued plugging of the intake structure. The project will be completed during the fall of 2007.

Martinsdale Outlet Canal Drop Structure Repair (Wheatland) **photo**

Repair work was completed on the Martinsdale Canal Drop Structure Number One in 2006. Deteriorating concrete was patched and fill was placed to provide better maintenance access. Funding included a $100,000 RRGL grant in 2005, $28,080 from the Water Storage Special Revenue Account and $12,000 from the water users association.

Nilan North Dam Outlet Repair (Lewis & Clark) **photo**

Nilan North Dam is located six miles west of Augusta, in Lewis & Clark County and is owned by DNRC. The North Dam, one of two on the reservoir, is an earth-fill structure constructed in 1951. The outlet structure at the North Dam is in very poor condition structurally and has deteriorated to the point that additional small repairs and patching are not economical or feasible. The accelerating deterioration of the dam is primarily a function of continuous freeze-thaw damage and severe cracking.

There is also a considerable amount of seepage that exits in the location of the outlet. Uncontrolled seepage along the side of the conduit could cause material to be removed from the dam embankment and cause failure of the dam. The repair work includes replacing the outlet structure and installing filters and drains at the outlet terminal structure to control and collect seepage. The cost of the project is estimated to be $105,000 with funding provided from the Water Storage Account. It is anticipated that the repairs will be completed by the summer of 2007.

Deadman's Basin Supply Canal Emergency Repair (Wheatland) **photo**

The Deadman's Supply Canal was renovated after a flood event caused significant damage. An RRGL Emergency Grant in the amount of $100,000; Hydropower Earnings Account funds in the amount of $277,000; an emergency grant of $75,332; Deadman's Water Users funds of $88,000; an RRGL loan of $55,000; and an ECG grant from the Governor's Office for $100,000 covered the emergency repair. Approximately two miles of the canal were reconstructed and more than one mile of the canal was lined with an EPDM membrane.

Deadman's Basin Project Phase Two Canal Repairs (Wheatland)

The Deadman's Supply Canal was renovated after a flood event caused significant damage. Major concrete structures were rehabilitated, and more than one mile of the canal was rebuilt and lined with an EPDM membrane. Federal and private funding of $450,000 was used for continuing repairs to this critical structure.

Ruby Dam Rehabilitation Feasibility Study (Madison) **photo**

Ruby Dam is a state-owned water storage project constructed in 1938. The dam is located in Madison County, about seven miles south of the Town of Alder. The dam is 111 feet in height and can impound 37,612 acre-feet of water at full pool. The Ruby Water Users Association operates and maintains the dam. The dam is classified as high hazard under the Montana Dam Safety Act. As a state-owned project, the responsibility and liability for this structure rests with the State of Montana.

The spillway is in extremely poor structural condition, and may not be able to safely accommodate the inflow design flood required for a dam of its size and hazard classification. Major structural concrete replacement is required to correct deficiencies. Rehabilitation will be accomplished in two major phases, pre-construction engineering, and final engineering design and construction. Contract preparation was completed and consultants selected for a feasibility study on Ruby Dam. The feasibility study is scheduled to be completed during the spring of 2007.

Frenchman Dam Rehabilitation Feasibility Pre-construction Engineering (Phillips) **photo**

Frenchman Dam is located about 22 miles north of Saco, in Phillips County. The project is situated on Frenchman Creek, a tributary of the Milk River. The drainage area of the project encompasses 2,460 square miles. The DNRC-owned dam is operated and maintained by the Frenchman Water Users Association. The dam is 44 feet in height and 2,100 feet long, with a dike on the west end that is eight feet tall and 1,000 feet long. The original earth-fill dam was completed in 1951.

The dam failed on April 15, 1952 due to very high stream flows resulting from rapid snowmelt and a very rapid filling of the reservoir. The dam was reconstructed in 1952-1953 with a larger spillway and revisions to the seepage cutoff. Annual dam safety inspections have revealed voids that developed over time beneath the spillway. DNRC received an RRGL Grant in the amount of $100,000 from the 2005 Legislative session and $65,000 was provided by in-kind services from DNRC.

DNRC staff has initiated a rehabilitation feasibility study for the rehabilitation of Frenchman Dam. The engineering consulting firm MAXIM, was selected and conducted a hydrologic and water availability analysis. HAZTEC Drilling was contracted to perform the borehole drilling and sampling. State Water Projects staff conducted the on-site geotechnical and geologic oversight during the drilling operations. Work was completed by late fall 2006. State Water Projects staff will finalize the feasibility study over the course of this winter for completion in spring 2007.

Toston Broadwater Bridge Replacement (Broadwater) **photo**

The replacement of the pedestrian and maintenance bridge over Toston Dam was a major rehabilitation project for DNRC's State Water Projects Bureau for fiscal year 2006. The project, which used $750,000 of Hydropower Earnings Account funds, was completed in the fall of 2006. Project operation and maintenance staff also completed a major lubrication tank-recoating project in September 2005, which accounted for most of that year's offline time for the power generation project.

Canal Operations

The DNRC State Water Projects Bureau Canal Operations Program is responsible for identifying and correcting operational deficiencies of 250 miles of state-owned canals. Major ongoing or recently completed activities include the following:

- The Deadman's Supply Canal was renovated after a flood event caused significant damage. Major concrete structures were rehabilitated, and more than one mile of the canal was rebuilt and lined with an EPDM membrane.
- Initial studies and preliminary construction work have been undertaken in order to restore the capacity of the Smith Creek Canal, a supply canal for Nilan Reservoir.
- Repair work was completed on the Martinsdale Canal Drop Structures Numbers 3 & 4. Existing concrete structures were fortified with the addition of new gabion structures.

Non-state owned Rehabilitation and Repair Projects

Lake Frances East Dam Rehabilitation (Pondera) **photo**

Lake Frances is located in Pondera County, near the Town of Valier. The North and East dams, measuring twenty and sixty feet in height, create the reservoir. The Pondera County Canal and Reservoir Company owns both dams, which were constructed in 1908-1909. Storage capacity is 105,000 acre-feet, which is considered large for a privately owned dam. The water has many benefits, including irrigation, municipal use by the City of Conrad, and for recreation by the general public. Both dams are classified as high hazard since the failure of either structure presents the potential to cause loss of life and property damage.

The outlet works on the East Dam have been slowly deteriorating over time. In 2002, an extensive grouting program was conducted to seal voids in the earthen embankment. It is believed that slow piping of material into the outlet conduit caused the voids. In 2003, the outlet conduit and gate tower were cored to evaluate the condition of the concrete. Originally, it was thought that complete outlet replacement would be needed. However, after additional investigation, it was determined that the outlet could be rehabilitated.

A two-phase rehabilitation approach is being utilized. Phase I involves the addition of a downstream drainage system and berm. Phase II involves the addition of a new upstream outlet tower and gates along with replacement of upstream concrete. Phase I construction began in September 2006, and was completed in November 2006. Phase II is scheduled to begin in fall of 2007. HKM Engineering

completed the design and is overseeing construction. The canal company decided to assume responsibility for the construction and used its own heavy equipment for the work. The canal company has authorization for an RRGL loan, but has opted to pay for the project using other resources.

Doney Lake Dam Rehabilitation (Powell County) photo

Doney Lake is located in Powell County, approximately five miles northeast of Ovando, Montana. Murphy Ranches, Inc. owns and maintains the dam and operates the reservoir for wildlife and irrigation purposes. Doney Lake is a natural wetland that had been converted to use as irrigation water storage by the construction of a ditch and earthen embankment. The lake covers 79 surface acres with a maximum depth of eight feet and a capacity of 206 acre-feet at normal operating pool.

Doney Lake is sustained by natural springs and provides excellent brood rearing habitat for over 17 species of waterfowl. The Doney Lake wetland complex is frequently used by grizzly bears for spring and fall foraging among its associated berry producing shrubs. Access to Doney Lake by the general public is by foot or horseback only for bird watching, hiking, and hunting.

Doney Lake Dam is classified as a high hazard dam due its size and the potential for loss of life downstream in the event of failure. Past inspections identified several serious problems with the dam. The reservoir lacked adequate spillway capacity and the outlet conduit showed signs of deterioration, indicating that it was very near the end of its useful life.

In the fall of 2005, Doney Lake Dam was rehabilitated using grant funding from the U.S. Fish and Wildlife Service. During rehabilitation the outlet works were replaced and a downstream drainage system was added. Ducks Unlimited provided engineering services and construction oversight.

Mill Lake Dam Rehabilitation (Ravalli)

Mill Lake Dam is located in the Selway-Bitterroot Wilderness Area, approximately fifteen miles west of the Town of Hamilton. The dam is owned by the Mill Creek Irrigation District, regulated by the U.S. Forest Service, and stores water used for irrigation. The dam, built in 1908, is an unsafe, high hazard dam in need of rehabilitation to meet standards of the Montana Dam Safety Program. The dam spillway is unable to convey the Probable Maximum Flood, which is a requirement of the U.S. Forest Service. Repairs to this dam are challenging due to Forest Service restrictions regarding activities permitted within wilderness areas.

Mill Lake Dam was experiencing excessive seepage around the outlet pipe and embankment. The outlet works was slip-lined, and a portion of the upstream face of the dam was lined and rip rapped in 2005. The first filling after this work was monitored in the spring of 2006. Spillway modifications are scheduled for the fall of 2007. The district plans to improve the spillway capacity, control erosion at the spillway, and improve the dam embankment to safely control seepage. Mill Creek Irrigation District received a grant of $100,000 and a loan of $472,000 through the RRGL Program in 2003. An additional $414,300 came from the irrigation district.

Basin Creek Dam #1 Rehabilitation (Silver Bow) **photo**

Basin Creek #1 is located above the City of Butte, in Silver Bow County. The reservoir is used to supply municipal water to Butte. The dam was built in the late 1800's and early 1900's. Butte purchased the dam in the early 1990's. The city depends on the dam, classified as high hazard, for a large portion of their drinking water. A large portion of South Butte would be inundated if Basin Creek Dam were to fail.

The city received grant funds available from the Department of Justice under the Natural Resource Damage Claim (NRD) program in the amount of $503,000. The city-county government of Butte-Silver Bow was able to contribute $303,000 for this rehabilitation.

Construction consisted of replacing and upgrading the emergency spillway, the addition of upstream control gates on the outlet and spillway and slip-lining of the outlet pipes. HKM Engineering of Billings provided engineering services and oversaw construction.

Vandalia Dam Rehabilitation (Valley) **photo**

Vandalia Diversion Dam is located on the Milk River, about three miles west of Vandalia, in Valley County. The dam diverts water into Vandalia Main Canal for irrigation of land in the vicinity of the towns of Vandalia, Tampico, Glasgow, and Nashua. The dam has been in continuous use since it was constructed in 1917. The Glasgow Irrigation District (GID) and the U.S. Bureau of Reclamation have performed regular maintenance and safety inspections over the years. An engineering analysis of the structure resulted in recommendations for repairs in several phases.

The primary goal of the project is to preserve the integrity and increase the service life of Vandalia Diversion Dam. A secondary goal is to conserve the water resources available to GID. Reduction of losses due to seepage and spilling will increase usable supply for district members and other upstream users. The objective of the project is to rehabilitate the struts and walkways of Vandalia Diversion Dam. The struts and walkways have undergone damage over the years, mainly from freeze-thaw cycles and ice flows.

Glasgow Irrigation District (GID) received a grant for Phase III of the rehabilitation during the 2005 legislative session. The grant has not yet been contracted because the irrigation district lacks the needed match funding. Phase III would be the next step toward complete rehabilitation of Vandalia Diversion Dam. The selected alternative is to replace the struts and walkways with concrete members cast in place. This alternative provided economic savings and will extend the service of the dam beyond that of replacing the deteriorated members with steel. DNRC has recommended that any further funding from the RRGL Program will come in the form of a low interest loan.

VI. HYDROPOWER PROGRAM

Hydropower

The Hydropower Program administers the development and operation of hydropower facilities on state-owned water projects. To date, one hydropower facility, the Broadwater Power Project near Toston, has been built. With a maximum capacity of 10 megawatts, the project began generating power in June 1989. DNRC owns and operates the facility and contracts with NorthWestern Energy to sell the energy.

Earned revenues are used to help finance the rehabilitation of other State Water Projects Bureau water projects. In an average year (assuming mean runoff), the facility is capable of generating roughly 56 million kilowatt-hours of electricity and earns roughly $3.5 million in revenue from energy and capacity sales. After debt payments and operating expenses, approximately $1.3 million is available to rehabilitate state-owned dams.

Most of the water storage projects managed by the SWPB were completed in the late 1930s and early 1940s and have significant needs including complying with spillway capacity standards and addressing structural deterioration. The earned revenue from Broadwater is critical for maintaining and repairing these structures so they meet current safety standards and codes. Statistics concerning the Broadwater Power Project during are shown in below.

Broadwater-Missouri Power Project in FY 2006	
Operating availability	93.6%
Gross energy generation kilowatt-hours	46,715,313
Gross revenue from sales	$3,282,920
Investment income	$134,895
Operating costs	($481,571)
Bond payments	$1,860,335
NET REVENUE	$1,075,909

Recent Accomplishments

The operation and maintenance staff completed a major lubrication tank-recoating project in September 2005, which accounted for most of the year's offline time. A major rehabilitation project underway for FY06 was the replacement of the pedestrian / maintenance bridge over the dam. The project, which used $750,000 of hydropower funds, was completed in the fall of 2006.

VII. APPENDIX

Water Storage Policy and Statutory Criteria

The 1991 Montana Legislature passed into law a policy to define when water storage is the best solution for solving specific water problems. When storage is determined to be the best alternative, the policy identifies criteria to use in ranking state-funded projects. (Sections 85-1-701-704 MCA).

85-1-703. Water storage policy

(1) The legislature recognizes that water resources needs are growing, existing water facilities are aging and in need of repair, and new water storage projects have become more difficult to complete. Other types of actions will be needed to solve many emerging problems, but if storage is the best way to meet growing water needs and solve problems, it should be actively pursued.

(2) In determining the best solution for a particular water management problem, the state shall:

a. carefully define the problem;
b. identify all options to solve the problem, including water storage;
c. determine whether water is physically and legally available to solve the problem; and
d. select the option that best meets the following criteria:
i. technical feasibility
ii. financial feasibility
iii . economic feasibility
iv. political feasibility
v. legal feasibility, and
vi. environmental feasibility

Water Storage Project Prioritization Policy

The statute calls for this report to the legislature and describes its requirements. The statute also identifies different criteria to be used to prioritize new water storage projects, storage rehabilitation projects, and budget priorities for the allocation of state water storage development funds. Section 85-1-704 Prioritization of water storage projects - governor's report, states:

(1) The governor shall submit to each regular session of the legislature a report identifying specific water storage projects proposed for development, including the rehabilitation of existing projects and new project proposals. The report must contain:

a) a list of water storage project priorities;
b) an implementation strategy for each priority project that identifies the resources (including specific budget requests), government actions, and other actions needed to accomplish the project;
c) a progress report on the development of water storage projects during the previous 2 years.

(2) In setting priorities among new water storage projects, the governor shall consider whether a project:

a) solves a severe water problem;

b) provides multiple uses and benefits;

c) provides for public uses;

d) shows strong evidence of broad citizen support;

e) is able to obtain non-state sources of funding;

f) protects and seeks to enhance social, ecological, cultural, aesthetic values;

g) improves local and state economic development;

h) could resolve Indian and federal reserved water rights issues;

i) supports water conservation activities; and

j) promotes the use of water reserved under Montana law.

(3) In setting priorities among water storage rehabilitation projects, the governor shall consider whether the project:

a) is needed to protect public safety;

b) has impacts if not repaired or rehabilitated; and

c) accomplishes the goals listed in subsection (2)(a) through (2)(j).

(4) In establishing budget priorities for the allocation of state storage development funds:

a) First preference must be given to projects that resolve threats to life and property posed by high-hazard facilities that are in an unsafe condition;

b) Second preference must be given to projects that improve or expand existing water storage facilities; and

c) Third preference must be given to the planning and construction of new water storage facilities.

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